

REMARKS

Claims 17-24 and 26-35 are pending in this application. By this Amendment, Applicants amend claims 17, 27, 28 and 35.

Claims 16-24 and 27-34 were rejected under 35 U.S.C. § 102(e) as being anticipated by Cosman (U.S. 5,651,104). Applicants respectfully traverse this rejection.

Claim 17 has been amended to recite:

"An image processing device for situating objects in virtual space by a computer system, developing a game while controlling the movements of said objects according to input control and set rules, and displaying circumstances in said virtual space as the screen seen from a virtual camera, wherein said image processing device is characterized by comprising:

polygons forming lines situated along a reference plane serving as the reference in said virtual space such that the reference plane and the polygons have a predetermined, fixed relationship to one another;

determination means for determining the positional relationship between said polygons and said virtual camera; and

polygon tilting means for tilting said polygons, according to the results of the determination, so as to increase the surface area of said polygons seen from said virtual camera to improve the visibility of the polygons from the virtual camera." (Emphasis added)

Claims 20, 23, 24, 27, 28, 31 and 35 recite features that are similar to the features recited in claim 17.

In conventional game devices, when the vertical angle of a virtual camera with respect to a playing field is reduced, the lines marking a playing field gradually disappear from the display screen. Additionally, when a line vector of one or more of the lines of the playing field and a camera's eye direction vector are parallel, the lines of the playing field become so fine that they cannot be displayed on a two-dimensional display screen.

To overcome the above-described problems with conventional game devices, the present claimed invention provides an image processing device that modifies the positional coordinates of some of the vertices of line polygons marking the playing field, such that, regardless of the virtual camera angle with respect to the playing field, the

lines are always visible. Particularly, the surface area of line polygons projected by the camera is increased by slightly elevating the height position of the vertices located farther away from the virtual camera.

The Examiner alleged that Cosman teaches "overcoming the problems associated with polygons having oblique angles (col. 3, lines 2-6) similar to the problem applicants have stated with regard to the viewing angle of a virtual camera of a virtual soccer game where the lines of the field (oblique polygons) become less visible as the camera's vertical angle is reduced. In Cosman the process of enhancing the thickness of the polygon line is the same as applicants rotation of a polygon line since the end results are the same and the process of supersampling the polygon effectively rotates texel data that would be thin to texel data that is thicker, thus, effectively rotating the line polygon."

However, Cosman is directed to a computer graphics systems which uses supersampling to provide a detailed "anti-aliased" display of texture on the surface defined at oblique angles within the model space (see Abstract).

In the Background of the Invention of Cosman (col. 3, lines 2-6), Cosman describes the problems with prior art systems. Particularly, with prior art systems, "the texture modulates the pixels along the length of the footprint and hardly modulates the pixels at all across the width of the footprint. This leads to a peculiar visual effect where textural details seem to attenuate very rapidly on oblique surfaces."

Thus, Cosman is directed solely to improving the appearance of textural details on oblique surfaces, and does not even address the problems that occur when the vertical angle of a virtual camera with respect to a playing field is reduced such that the lines marking the playing field gradually disappear, and certainly fails to teach or suggest the unique combination and arrangement of elements recited in the present claimed invention to solve these problems.

The system of Cosman fails to teach or suggest polygon tilting means or camera angle adjusting means, and in fact, Cosman fails to provide any means for manipulating the tilt of the polygons or the angle of the camera. In contrast, Cosman merely teaches means for adjusting the textural details based on the angle of oblique surface.

The Examiner's description of the prior art rejection over Cosman clearly indicates that the Examiner has failed to specifically describe the elements of Cosman which correspond to the specific elements recited in the present claimed invention, and instead, has reduced the inventions recited in the claims to an abstract objective of improving the visibility of lines of a soccer field. However, Applicant's invention must be considered "as a whole". Medtronic, Inc., v. Cardiac Pacemakers, Inc., 721 F.2d 1563, 220 USPQ 97, 99-100 (Fed. Cir. 1983). Rather than considering the invention "as a whole," the Examiner improperly reduced Applicant's claimed invention to the "idea" of improving the visibility of the lines of a soccer field. Reducing a claimed invention to an "idea" and then determining patentability of that "idea" is error. Jones v. Hardy, 727 F.2d 1524, 1528, 220 USPQ 1021, 1024 (Fed. Cir. 1984).

Accordingly, Applicants respectfully submit that Cosman fails to teach or suggest the unique combination of elements recited in claims 17, 20, 23, 24, 27, 28, 31 and 35 of the present application.

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 17, 20, 23, 24, 27, 28, 31 and 35 are allowable. Claims 18, 19, 21, 22, 26, 29, 30 and 32-34 depend upon claims 17, 20, 23, 24, 27, 28, 31 and 35, and are therefore allowable for at least the reasons that claims 17, 20, 23, 24, 27, 28, 31 and 35 are allowable.

In view of the foregoing Amendments and Remarks, Applicants respectfully submit that this Application is in condition for allowance. Favorable consideration and prompt allowance are respectfully solicited.

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The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

17. An image processing device for situating objects in virtual space by a computer system, developing a game while controlling the movements of said objects according to input control and set rules, and displaying circumstances in said virtual space as the screen seen from a virtual camera, wherein said image processing device comprises:

polygons forming lines situated along a reference plane serving as the reference in said virtual space such that the reference plane and the polygons have a predetermined, fixed relationship to one another;

determination means for determining the positional relationship between said polygons and said virtual camera; and

polygon tilting means for tilting said polygons, according to the results of the determination, so as to increase the surface area of said polygons seen from said virtual camera to improve the visibility of the polygons from the virtual camera.

27. An image processing device for displaying circumstances in virtual three-dimensional space in the form of images seen from a camera, wherein said image processing device comprises:

polygons forming lines situated along a reference plane serving as a reference in said virtual three-dimensional space such that the reference plane and the polygons have a predetermined, fixed relationship to one another;

determination means for determining the positional relationship between said polygons and said virtual camera; and

polygon tilting means for tilting said polygons, according to the results of the determination by said determination means, so as to increase the surface area of said polygons seen from the virtual camera to improve the visibility of the polygons from the virtual camera.

28. An image processing device for displaying circumstances in virtual three-dimensional space in the form of images seen from a virtual camera, wherein said image processing device comprises:

polygons forming lines situated along a reference plane serving as a reference in said virtual three-dimensional space such that the reference plane and the polygons have a predetermined, fixed relationship to one another;

determination means for determining the positional relationship between said polygons and said virtual camera; and

polygon tilting means for tilting said polygons, according to the results of the determination by said determination means, so as to allow the vertices in the interior, relative to said virtual camera, of said polygons to stand out from said reference plane, while centered on the vertices in the front, relative to said virtual camera, of said polygons.

35. A game device for situating objects in virtual space formed in a computer system, developing a game while controlling the movements of said objects according to input control and set rules, and displaying circumstances in said virtual space on a screen as seen from a virtual camera, said game device comprising:

polygons forming lines situated along a reference plane serving as a reference in a virtual space such that the reference plane and the polygons have a predetermined, fixed relationship to one another; and

a position changing means for changing positions of said polygons to enlarge an area of said polygons according to the angle relationship between said virtual camera and said polygons, such that the visibility of the polygons from the virtual camera is improved.